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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/603,078	06/25/2003	Kenji Matsumoto	Q76242	1880

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SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER	
CONNELLY CUSHWA, MICHELLE R	
ART UNIT	**PAPER NUMBER**
2874	

DATE MAILED: 08/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H+A

Office Action Summary	Application No.	Applicant(s)	
	10/603,078	MATSUMOTO ET AL.	
	Examiner	Art Unit	
	Michelle R. Connelly-Cushwa	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☒ Claim(s) *19* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 June 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *0305*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Applicant's Amendment filed June 15, 2005 has been fully considered and entered.

The indicated allowability of claims 2, 4, 6, 8, 10, 11, 13, 14 and 16 is withdrawn in view of the newly discovered reference(s) to Kwark (US 5,189,296). Rejections based on the newly cited reference(s) follow.

Information Disclosure Statement

The prior art documents submitted by applicant in the Information Disclosure Statement filed on March 23, 2005 have all been considered and made of record (note the attached copy of form PTO-1449).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kwark (US 5,189,296).

Regarding claim 1; Kwark discloses a transmission apparatus using an optical fiber (50; see Figure 1), comprising:

- an optical fiber (50); and

- a photodetector (photodetector, 40 in Figure 1; photodetector array, 40 in Figures 2 and 3) for detecting light, which has been propagated through the fiber (50);
- wherein the photodetector comprises a plurality of semiconductor light receiving devices (200), whose light receiving sensitivity wavelength regions are identical with one another, each of the semiconductor light receiving device having a light receiving area;
- wherein the optical fiber (optical transmission media) can align with a small group of cells (200; see column 6, lines 21-25).

Kwark does not specifically state that the optical fiber is plastic or that the light receiving area of each light receiving device (200) is smaller than a cross-sectional area of a core of a plastic optical fiber. However, Kwark does teach that the cell size for each detector cell in the array is typically 50 x 50 microns and that this dimension will vary according to the array size and the dimensions of the transmission media, and that the transmission media can align with a group of cells.

Plastic optical fibers having core diameters ranging from ten to several hundred microns are well known in the art. Therefore, one of ordinary skill in the art would have found it obvious to incorporate a plastic optical fiber having a core diameter of up to several hundred microns in the invention of Kwark, since such fibers are well known, commonly used and readily available in the art, and Kwark does not disclose that a particular optical fiber of a particular core diameter must be used in the invention, thereby indicating a lack in the criticality of the optical fiber used, and it appears that the

invention would perform equally well regardless of the particular type and size of optical fiber employed. Furthermore, one of ordinary skill in the art would have found it obvious to have the cell size for each detector cell be 50 by 50 microns or less depending on the dimensions of the optical fiber employed, since Kwark teaches that the dimensions of the detector cells varies according to the dimensions of the light transmission media and that the optical transmission media can align with a group of cells. Thus, one of ordinary skill in the art would have found it obvious to have the light receiving area of each light receiving device (200) be smaller than a cross-sectional area of a core of a plastic optical fiber in the invention of Kwark.

Regarding claim 2; Kwark teaches that the plurality of semiconductor light receiving devices (200) are located such that the plurality of semiconductor light receiving devices (200) directly receive the light, which is radiated out from the optical fiber (transmission media), without an optical system intervening between the fiber and the semiconductor light receiving devices (see Figure 1). Kwark further teaches that the optical fiber (transmission media) is aligned with a small group of the light receiving devices (cells, 200) and that the cells that are not aligned to the fiber are turned off (see column 6, lines 21-30). Therefore, a total sum of the light receiving areas (the areas of the light receiving devices aligned with the transmission media) of the plurality of light receiving devices (200) is approximately equal to a cross-sectional area of the fiber in the invention of Kwark.

Regarding claims 3 and 4; Kwark discloses all of the limitations of claims 3 and 4 as applied above, except for having the response band of the light receiving devices be

at least 1 GHz. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the light receiving device have a response band of at least 1 GHz in order to be able to detect light over a band of at least 1 GHz so that the device may be used with bands having a width of 1 GHz or more, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (*In re Aller*, 105 USPQ 233), and discovering an optimum value of a result effective variable involves only routine skill in the art (*In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)).

Regarding claims 5 and 6; the plurality of the semiconductor light receiving devices (200) are formed on a single same base plate (100) in the invention of Kwark (see Figure 3 and column 3, lines 15-17).

Regarding claims 7 and 8; the plurality of the semiconductor light receiving devices (200) are each connected to one of a plurality of independent amplifiers (see column 4, lines 17-19).

Regarding claim 9; the plurality of the semiconductor light receiving devices are formed on a single common base plate (100) and are electrically isolated from one another (each light receiving device, 200, is electrically isolated from the other light receiving devices, thereby enabling each light receiving device to be independently turned on or off; see column 4, line 17-39, and column 6,lines 16-34).

Regarding claim 10; Kwark teaches all of the limitations of claim 10 as applied above, except for the base plate having a rectangular shape. The base plate (100) is

divided into four sub regions, which are arrayed in two columns and two rows (see Figure 3), and each of the semiconductor light receiving devices (200) is formed on one of the four subregions of the base plate. More than mere change of form or rearrangement of parts is necessary for patentability (*Span-Deck Inc. v. Fab-Con, Inc.* (CA 8, 1982) 215 USPQQ 835). Change in form of any element of prior patent must result in more than useful natural phenomenon that man has accumulated through common knowledge; even though use of new device greatly improves field and provides great utility, and commercial success is enjoyed because of long-felt need, these features cannot sustain patentability where involved is only extended application of obvious attributes from prior art (*Span-Deck Inc. v. Fab-Con, Inc.* (CA 8, 1982) 215 USPQQ 835). One of ordinary skill in the art would have found it obvious to form the base plate (100) disclosed by Kwark in any desired shape, including a circle or a rectangle in order to make the base plate fit in any desired system/module, since it appears the device would perform equally as well regardless of the shape, and a change in shape of an element is generally within the level of ordinary skill in the art.

Regarding claim 11; each of the semiconductor light receiving devices (200) is formed on one of the four subregions of the base plate, such that a light receiving section of the light receiving device is located at a position shifted from a center point of the subregion toward a center point of the entire base plate.

Regarding claim 12; Kwark teaches all of the limitations of claim 12 as applied above, except for the plurality of the semiconductor light receiving devices (200) being formed on a plurality of independent base plates. It would have been obvious to one

having ordinary skill in the art at the time the invention was made to have the plurality of the semiconductor light receiving devices (200) be formed on a plurality of independent base plates, since is has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. *Nerwin v. Erlichman*, 168 USPQ 177, 179.

Regarding claims 13 and 14; Kwark teaches that there are four photodetector arrays (4) formed on the base plate (100), the arrays positioned in two columns and two rows. As discussed above, one of ordinary skill in the art would have found it obvious to form the base plate (100) disclosed by Kwark in any desired shape, including a circle or a rectangle in order to make the base plate fit in any desired system/module, since it appears the device would perform equally as well regardless of the shape, and a change in shape of an element is generally within the level of ordinary skill in the art and it would have been obvious to one having ordinary skill in the art at the time the invention was made to have the plurality of the semiconductor light receiving devices (200) be formed on a plurality of independent base plates, since is has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. *Nerwin v. Erlichman*, 168 USPQ 177, 179. Thus, one of ordinary skill in the art would have found it obvious to form each photodetector array (40) on an independent base plate, thereby providing four base plates that are arrayed in two columns and two rows, wherein each of the semiconductor light receiving devices (200) is formed on one of the four base plates, such that a light receiving section of the

semiconductor light receiving device is located at a position shifted from a center point of the base plate toward a center point of the array of the four base plates.

Regarding claims 15 and 16; Kwark teaches all of the limitations of claims 15 and 16 as applied above, except for the fiber being a graded index type of fiber. Kwark does not disclose that any particular type of optical fiber must be used in the invention, thereby indicating a lack of criticality and suggesting to one of ordinary skill in the art that any type of known optical fiber may be employed in the invention. Therefore, one of ordinary skill in the art would have found it obvious to use a graded index type of fiber in the invention of Kwark to collimate and/or focus the light transmitted through the fiber as desired, since Kwark does not teach that a specific fiber is used and graded index type fibers are known and readily available in the art.

Regarding claim 17; Kwark teaches all of the limitations of claim 17 as applied above, except for the core diameter of the plastic fiber being at least 500 micrometers. It would have been obvious to one of ordinary skill in the art to have the core diameter be any desired value, including 500 micrometers, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (*In re Aller*, 105 USPQ 233), and discovering an optimum value of a result effective variable involves only routine skill in the art (*In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)).

Regarding claim 18; the photodetectors (40) taught by Kwark are photodiodes.

Claims 1 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ruhrmann (US 4,936,681).

Regarding claim 1; Ruhrmann discloses a transmission apparatus using an optical fiber (10; see Figures 3 and 4), comprising:

- a plastic optical fiber (10; see column 5, lines 20-22); and
- a photodetector (detector array, 22) for detecting light, which has been propagated through the fiber (10);
- wherein the photodetector comprises a plurality of semiconductor light receiving devices (23), whose light receiving sensitivity wavelength regions are identical with one another, each of the semiconductor light receiving device having a light receiving area.

Ruhrmann dose not explicitly state that each of the semiconductor light receiving devices has a light receiving area smaller than a cross-sectional area of a core of the plastic fiber. However, as shown in Figures 3 and 4 of Ruhrmann, the cross-sectional area of each of the light receiving devices (23) is smaller than a cross-sectional area of an optical fiber (10), and in column 8, lines 40-44, Ruhrmann teaches that almost any desired resolution can be achieved by selecting a corresponding number of detector elements. One of ordinary skill in the art, given the benefit of the disclosure of Rhurmann, would have found it obvious to incorporate as many photodetectors in an area as desired to increase the resolution, including incorporating a plurality of photodetectors within an area that is equal to a cross-sectional area of the core of the optical fiber, thus having each of the semiconductor light receiving devices have a light receiving area smaller than a cross-sectional area of a core of the plastic fiber, which is suggested by Figures 3 and 4 of Ruhrmann.

Allowable Subject Matter

Claim 19 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art cited on attached form PTO-892 is the most relevant prior art known, however, the invention of claim 19 distinguishes over the prior art of record because none of the references either alone or in combination disclose or render obvious a transmission apparatus as defined in claim 19, wherein each of the light receiving areas of the plurality of the semiconductor light receiving devices are asymmetrical in combination with the limitations of the base claim.

Hence, there is no reason or motivation for one of ordinary skill in the art to use the prior art of record to make the invention of claim 19.

Response to Arguments

Applicant's arguments with respect to claims 1-29 have been considered but are moot in view of the new ground(s) of rejection..

Conclusion

Any inquiry concerning the merits of this communication should be directed to Examiner Michelle R. Connelly-Cushwa at telephone number (571) 272-2345. The examiner can normally be reached 9:00 AM to 7:00 PM, Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney B. Bovernick can be reached on (571) 272-2344. The fax phone

number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general or clerical nature should be directed to the Technology Center 2800 receptionist at telephone number (571) 272-1562.

Michelle R. Connelly-Cushwa
Primary Examiner
July 27, 2005